

THE FAMILY CHROMADORIDAE FILIPJEV, 1917 (NEMATODA, CHROMADORIDA) FROM TWO BEACHES OF TENERIFE (CANARY ISLANDS, NE ATLANTIC OCEAN)

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RESUMEN

Tres especies pertenecientes a la familia Chromadoridae Filipjev, 1917 se recolectaron durante la realización de un estudio ecológico sobre el intermareal y submareal somero de dos playas de Tenerife. Dos de estas especies fueron determinadas a nivel genérico: *Actinonema* sp y *Hypodontolaimus* sp, debido a la ausencia de adultos en el primer género y las malas condiciones de conservación del segundo. La tercera especie identificada fue *Ptycholaimellus ponticus* (Filipjev, 1922). Se aportan las descripciones, figuras y datos merísticos de las tres especies, así como datos ecológicos de las estaciones de muestreo.

Palabras clave: Nematoda, Chromadoridae, vida libre, fondos blando, Tenerife, Islas Canarias.

ABSTRACT

Three species of the family Chromadoridae were collected during an ecological study of the intertidal and shallow soft-bottoms of two beaches in Tenerife. Two of these species were determined to genus level: *Actinonema* sp and *Hypodontolaimus* sp, due to the lack of adult specimens in the first genus and the presence of adults in poor conditions in the second. Another species recorded was *Ptycholaimellus ponticus* (Filipjev, 1922). Descriptions, figures and meristic data of each species are presented, as well as, autoecological data from sampling stations.

Key words: Nematoda, Chromadoridae, free-living, soft-bottoms, Tenerife, Canary Islands.

INTRODUCTION

The family Chromadoridae Filipjev, 1917 is established using the following two holapomorphies: 1) there is always only a single, anterior testis; 2) the anterior ovary is always situated in the right of the intestine and the posterior gonad always to the left of it (Lorenzen [4]). Additional features are the cuticle always striated and ornamented. Inner labial sensilla minute or inconspicuous. 6 shorter outer labial setae and 4 larger cephalic setae arranged in two separate circles, except in the subfamily Euchromadorinae. Males of many species have cup-shaped or tubular precloacal supplements or lacking.

Several species belonging to the family Chromadoridae were collected during an ecological study of the soft-bottoms on the south coast of Tenerife. A detailed study revealed that these specimens belong to three different species: *Actinonema* sp., represented only by a juvenile, *Hypodontolaimus* sp. represented by one juvenile and one male in poor conditions and *Ptycholaimellus ponticus* (Filipjev, 1922) represented by two females.

MATERIAL AND METHODS

Samples were collected in the intertidal and shallow subtidal, 3 m deep, soft-bottoms of Los Abrigos (SE Tenerife) and Los Cristianos (SW Tenerife). PVC cores of 4,5 cm of inner diameter were taken to a depth of 30 cm in the sediment. These samples were fixed with 10% formaldehyde in seawater for one day and decanted through a sieve of 63 mm mesh size, and posteriorly preserved in 70% ethanol. Specimens were mounted in glycerine gel and drawings of these were done using a camera lucida on a Leica DMLB microscope equipped with Nomarski interference contrast. All measurements are in micrometers and curves structures are measured along the arc.

Abbreviations used in the text are: a, body length divided by maximum body diameter; b, body length divided by pharyngeal length; c, body length divided by tail length; c', tail length divided by anal body diameter; cbd, corresponding body diameter; s', spicule length divided by anal body diameter; %V, position of vulva as a percentage of body length from anterior.

SYSTEMATICS

Subclass CHROMADORIA Pearse, 1942

Order CHROMADORIDA Chitwood, 1933

Suborder CHROMADORINA Filipjev, 1918

Family CHROMADORIDAE Filipjev, 1917

Genus *Actinonema* Cobb, 1920

This genus is characterized by having a head not set off. 6 outer labial setae and 4 cephalic ones. Cuticle heterogeneous with lateral differentiation. Amphids elliptical with double contour. Spicules simple and arcuated. Lateral pieces of the gubernaculum "L-shaped". Males with one outstretched ovary and females with two opposed and reflexed ovaries. Precloacal supplements lacking.

Seven species of this family have been so far described: *Actinonema celtica* Boucher, 1976, *A. fidatum* Vitiello, 1970, *A. longicaudatum* Steiner, 1918, *A. pachydermatum* Cobb, 1920, *A. grafi* Jensen, 1991, *A. paraceltica* Muthumbi & Vincx, 1998 and *A. smolae* Muthumbi & Vincx, 1998.

***Actinonema* sp.**

(Fig. 1, Tab. 1)

Meristic data and studied material: Cristianos subtidal: March 2001, 1 juvenil (Juvenil 1).

Description: Males and females not found.

Juvenil: Body slender, tapering towards both ends. Head round and not set off. Cuticle annulated, with lateral differentiation 3 μm wide at the level of the posterior end of the pharynx. Amphids are 65% of the corresponding body diameter in width, simple and elliptical with double contour, located at 6 μm from the anterior end. Buccal cavity conical without noticeable dorsal tooth. Inner labial setae lacking. Outer labial setae inconspicuous and 6 cephalic setae 0.5 cephalic diameters long, situated in the median part of the head. Pharynx slender and cylindrical.

Reproductive system not developed. Tail 8 anal diameters long, filiform in most of its length, posterior tip acuminate. Caudal setae lacking, Spinneret poorly developed.

Discussion: The genus *Actinonema* closely resembles the genus *Rhyps* Cobb, 1920, but can be differentiated in having simple or lacking spicules and the genus *Rhyps* presents jointed spicules (Muthumbi & Vincx [5]). Canarian specimen presents more affinities with females of the genus *Actinonema*. However, the studied individual differs from the remaining species of *Actinonema* in having a smaller amphid and larger cephalic setae (0.5 cephalic diameters long).

Ecology: This species was collected in fine sands ($Q_{50} = 0.16$), with a very good selection ($S_0 = 0.59$). The organic matter content was 0.81% and 24.10% of carbonates percentage.

Genus *Hypodontolaimus* De Man, 1886

This genus is characterized by having homogeneous cuticular ornamentation with lateral differentiation formed by two or four longitudinal files of punctations. Buccal cavity with a hollow dorsal tooth “S-shaped” and dorsal apophysis. Oesophageal bulb developed. Precloacal supplements cup-shaped, sometimes absent. Males with one anterior testis and females with two reflexed ovaries.

***Hypodontolaimus* sp.**

(Fig. 2, Tab. 2)

Meristic data and studied material: Abrigos subtidal: May 2000, 1 juvenil (Juvenil 1); Cristianos subtidal: April 2001, 1 male ($\sigma 1$).

Description:

Male: Body slender, tapering towards both ends. Head round and slightly set off. Cuticle ornamented with homogeneous punctations and lateral differentiation formed by two longitudinal files of punctations (1 μm wide at the level of the median part of the pharynx). Amphids not seen. Buccal cavity large and conical with a developed dorsal tooth. 6 inner labial setae lacking. Outer labial setae 4 μm long and 4 cephalic setae 0.5 cephalic diameters long, located at the anterior part of the head. Subcephalic setae absent. Pharynx slender and cylindrical.

The reproductive system is monorchic, with one anterior testis. Spicules 0.6 anal diameters long, paired, arcuated, with a capitulum. Gubernaculum 0.3 anal diameters long, narrow and without apophysis. Precloacal supplements absent. Tail 1.7 anal diameters long, conical and with an acuminate posterior tip. Caudal setae lacking. Spinneret developed. Females not found.

Discussion: The studied material is related to the genera *Chromadorita*, *Megadontolaimus* and *Hypodontolaimus*, belonging to the latter due to the presence of lateral differentiation and homogeneous cuticle (Pastor de Ward [6]). *Hypodontolaimus* sp. is characterized by having a short tail, lacking somatic setae and precloacal supplements. This species was determined to genus level due to the poor conditions and low number of collected individuals.

Ecology: In the subtidal of Los Abrigos this species was recorded in medium sands ($Q_{50} = 0.34$), with a very good selection ($S_0 = 0.83$). The organic matter content was 0.50% and 5.47% of carbonates percentage was. In the subtidal of Los Cristianos was collected in fine sands ($Q_{50} = 0.16$), with a very good selection ($S_0 = 0.56$). The organic matter percentage was 0.53% and 22.56% of carbonates content.

Genus *Ptycholaimellus* Cobb, 1920

This genus is characterized by having a hollow dorsal tooth “S-shaped”. Double oesophageal bulb. Precloacal supplements absent. Males with one outstretched and anterior testis. Females with two opposed and reflexed ovaries.

16 species of this genus have been so far described: *P. adocius* Daschenko & Belogurov, 1984, *P. boucheri* Jensen & Nehring, 1992, *P. carinatus* Cobb, 1920, *P. inaequibulbus* (Aminova & Galtsova, 1978), *P. jacobi* Jensen & Nehring, 1992, *P. jenseni* (Gerlach, 1951), *P. hibernus* Eskin & Hopper, 1985, *P. lizardiensis* Decraemer & Coomans, 1978, *P. macrodentatus* Timm, 1961, *P. monodon* (Stekhoven, 1942), *P. pandispiculatus* (Hopper, 1961), *P. penninae* Muthumbi & Vincx, 1998, *P. ponticus* (Filipjev, 1922), *P. slacksmithi* (Inglis, 1969), *P. setosus* Pastor de Ward, 1984 and *P. vincxae* Jensen & Nehring, 1992.

Ptycholaimellus ponticus (Filipjev, 1922)

(Fig. 3, Tab. 3)

Hypodontolaimus ponticus Filipjev [1]: 132, fig. 14 a-c.

Ptycholaimellus ponticus.- Gerlach [2]: 109, fig. 3 a-h; Jensen & Nehring [3]: 242, fig. 2 d-f, 3; Muthumbi & Vincx [5]: 138, fig. 10 a-g.

Meristic data and studied material: Cristianos intertidal: November 2000, 2 females (♀1 and ♀2).

Description:

Males not found.

Female: Body slender, tapering towards both ends. Head slightly round, not set off and without cephalic capsule. Cuticle annulated with homogeneous punctations and heterogeneous lateral differentiation. Amphids inconspicuous. Buccal cavity large, with a cuticularized and developed dorsal tooth. Inner labial setae lacking. Outer labial setae difficult to discern. 4 cephalic setae 0.5 cephalic diameters long, located at the anterior half of the head. Subcephalic setae absent. Pharynx slender and cylindrical. Ventral gland and nerve ring not seen.

The reproductive system is diorchic with two reflexed ovaries. Vulva located at 48.5-54.3% of the total body length. Tail 3.1 anal diameters long, cylindrical and filiform in its posterior part, with a round tail tip. Caudal setae absent. Spinneret poorly developed.

Discussion: Canarian specimens agree well with the description of Jensen & Nehring [3]. This species is characterized by having a narrow body, cephalic setae shorter than one head diameter, subventral teeth poorly developed, oesophageal bulb double and cuticle pattern heterogeneous. British specimens present a non filiform tail and slightly larger (3.5-4.4 anal diameters long) (Platt & Warwick [7]) compared to the Canarian specimens.

Ecology: This species was collected in fine sands ($Q_{50} = 0.17$), with a very good selection ($S_0 = 0.68$). The organic matter content was 0.81% and carbonates percentage was 19.49%.

Distribution: Cosmopolitan (Jensen & Nehring [3]). This species is first recorded in the Canary Islands.

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REFERENCES

- [1] FILIPJEV, I. 1922. Encore sur les Nématodes libres de la Mar Noire. *Trudy Stavropol. Sel. Khoz. Inst.*, 1: 83-184.
- [2] GERLACH, S. 1951. Revision der Metachromadoracea, einer Gruppe freilebender mariner Nematoden. *Kieler. Meeresforsch.*, 8: 59-75.
- [3] JENSEN, P. & S. NEHRING. 1992. Review of *Ptycholaimellus* Cobb (Nematoda, Chromadoridae), with descriptions of three species. *Zool. Scri.*, 21(3): 239-245.

- [4] LORENZEN, S. 1994. *The phylogenetic systematics of freeliving nematodes*. The Ray Society (ed.), London, 383 pp.
- [5] MUTHUMBI, A. & M. VINCX. 1998. Chromadoridae (Chromadorida: Nematoda) from the Indian Ocean: Difficulties in morphological identification of *Actinonema* Cobb, 1920 and *Rhyps* Cobb, 1920. *Hydrobiologia*, 155-167.
- [6] PASTOR DE WARD, C. 1984. *Ptycholaimellus setosus* sp. nov. Nueva especie de nematodo marino de vida libre (Chromadoridae, Hypodontolaiminae) de Puerto Deseado, Santa Cruz, Argentina. *Neotropica*, 30(83): 11-18.
- [7] PLATT, H.M. & R.M. WARWICK. 1988. *Free-living marine nematodes. Part II. British Chromadorids*. Kermarck, D.M. & R.S. Barnes (eds.). Cambridge University Press. London, 501 pp.

FIGURES AND TABLES

	Juvenil 1
Total body length	1185.7
a	30.2
b	15.1
c	6
Cephalic diameter	11.4
Inner labial setae	—
Outer labial setae	—
Cephalic setae	5
Subcephalic setae	—
Buccal cavity diameter	8.6
Amphid diameter	8.6
Amphid height	4.3
Amphid from anterior	10
Pharynx length	78.6
Pharynx cbd	28.6
Maximum body diameter	39.3
Vulva from anteriorr	
% V	
Spicule length	
Gubernaculum length	
s'	
Tail length	196.4
Anal body diameter	25
c'	7.9
Spicule length/Tail length	

Table 1.-
Measurements of *Actinonema* sp in μm .

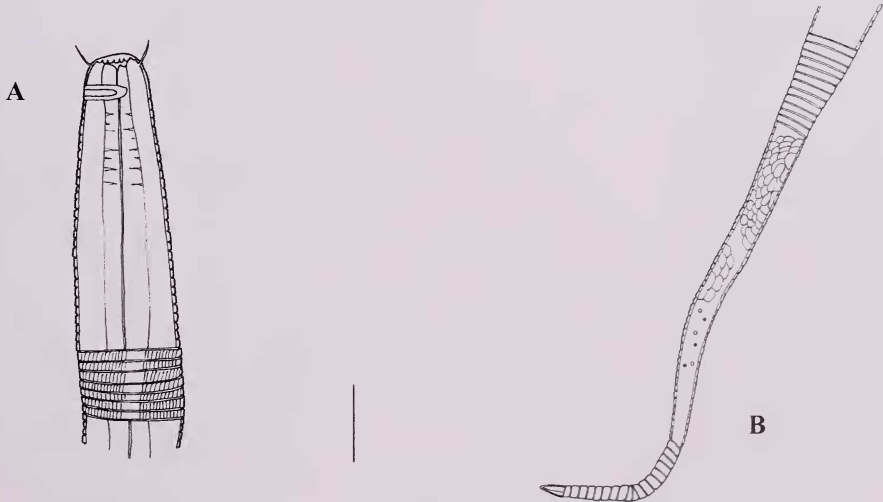


Figure 1.- *Actinonema* sp. Juvenil. A. Anterior end. B. Posterior end. Scale A = 15 μm , B = 20 μm .

	♂ 1	Juvenil 1
Total body length	971.4	1157.1
a	19.4	20.3
b	3.8	4.1
c	19.8	13.5
Cephalic diameter	31	21.4
Inner labial setae	-	-
Outer labial setae	4	-
Cephalic setae	15.6	-
Subcephalic setae	-	7.1
Buccal cavity diameter	14.3	17.1
Amphid diameter	11	17.1
Amphid height	11.4	-
Amphid from anterior	8.6	-
Pharynx length	257.1	285.7
Pharynx cbd	39.3	25
Maximum body diameter	50	-
Vulva from anterior	-	-
% V	-	-
Spicule length	16	-
Gubernaculum length	11.4	-
s'	0.6	-
Tail length	49	85.7
Anal body diameter	29	46.4
c'	1.7	1.8
Spicule length/Tail length	0.3	-

Table 2.-
Measurements of
Hypodontolaimus sp in μm .



Figure 2.- *Hypodontolaimus* sp. Male. **A.** Anterior end. **B.** Posterior end. Scale A = 20 μm , B = 15 μm .

	♂ 1	♀ 2
Total body length	1185.7	1028.6
a	18.5	16.9
b	6.9	5.5
c	7.1	7.8
Cephalic diameter	25.7	22.9
Inner labial setae	-	-
Outer labial setae	-	-
Cephalic setae	14	15
Subcephalic setae	-	-
Buccal cavity diameter	11.4	10
Amphid diameter	-	-
Amphid height	-	-
Amphid from anterior	-	-
Pharynx length	171.4	185.7
Pharynx cbd	50	53.6
Maximum body diameter	64	60.7
Vulva from anterior	644.1	500
% V	54.3	48.6
Spicule length		
Gubernaculum length		
s'		
Tail length	167.9	132.1
Anal body diameter	53.6	42.9
c'	3.1	3.1
Spicule length/Tail length		

Table 3.-
Measurements of
Ptycholaimellus ponticus in μm .

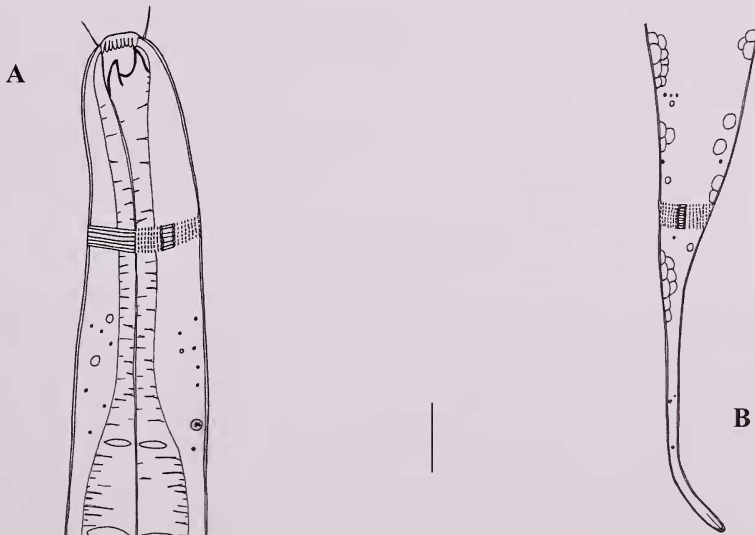


Figure 3.- *Ptycholaimellus ponticus*. **A.** Anterior end. **B.** Posterior end. Scale = 22 μm .

